

# SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR.

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THE meagre description given by surgical authors of this injury, and the importance of its thorough comprehension, in order that the treatment may be efficient, must be my excuse for reporting the following cases.

I cannot think that the accident is so rare as standard surgical works would lead one to believe; for instance, in the system of surgery by Messrs. Holmes and Hulke, reference is only given to two cases, one by Mr. Holmes and another by Mr. Pusey; but in the latter instance the epiphysis was displaced laterally and not, as is usually the case, anteriorly.

In Dr. Hamilton's treatise on fractures and dislocations, five cases are quoted, in four of which amputation had to be performed, whilst the fifth is said to have taken place during the delivery of a child which was still born.

In the museum attached to the Medical Department of the Yorkshire College are two interesting specimens; in the first, which is represented in Fig. 1, amputation of the thigh had been performed by Mr. Wheelhouse for gangrene, on the forty-third day after injury, which

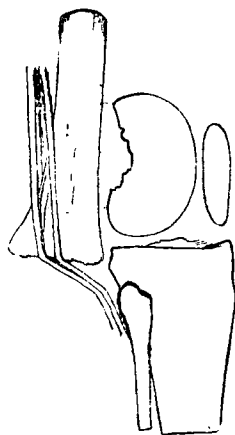
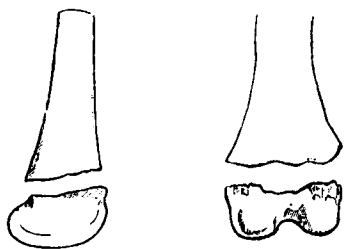


FIG. 1. MR. WHEELHOUSE'S CASE OF SEPARATION OF THE LOWER EPIPHYSIS OF THE FEMUR.

had displaced the lower epiphysis of the femur. The diagram illustrates well how the lower end of the upper fragment presses on the vessels, obstructing the circulation; and on the nerve, producing great pain along its course and numbness of the lower part of the limb. The detached epiphysis is seen lying with its fractured surface on the front of the femur, its articular surface being directed forward. The gastrocnemius is attached to the diaphysis.

The second specimen, a drawing of which is shown in Figures 2 and 3, was from a primary amputation of the thigh performed by the late Mr. Sam. Hey, on account of compound diastasis of the lower epiphysis of the femur. In this case the lower end of the diaphysis projected through the wound in the popliteal space, whilst the epiphysis was displaced forward.



FIGS. 2 AND 3. MR. HEY'S CASE OF COMPOUND DIASTASIS OF THE LOWER EPIPHYSIS OF THE FEMUR.

The following case came under my own care at the Infirmary. Fred Vasey, laborer, æt. 16, was admitted to the Infirmary on Dec. 29, 1885, on account of injuries which had been produced by an unshod horse, which had kicked him above the outer side of the left knee joint two days previously.

After being struck, he fell down and was unable to rise again; he was carried home, and soon afterwards was seen by a surgeon, who applied evaporating lotions and sand bags.

When admitted to the infirmary there was considerable swelling with fluctuation around the knee. The leg and foot were enormously swollen, due to œdema and venous congestion, the foot was everted and the leg rotated outwards.

No pulsation could be felt in either the anterior or posterior tibial arteries, the circulation being arrested by the sharp edge of the bone (the lower end of the diaphysis of the femur), which was pressing on the popliteal vessels, and making the skin bulge in the popliteal space. The leg and foot were quite numb but the patient suffered intense pain when movement was attempted. The injured joint was in a state of

semi-flexion, and extension could only be effected at the expense of great pain.

A marked depression was felt immediately above the patella, beneath which could be felt a movable mass with rounded edges. The heads of the tibia and fibula appeared to be normal.

The limb was shortened to the extent of about one inch and a quarter. A diagnosis of separation of the lower epiphysis of the femur was made.

The patient was placed under ether, when the limb was fully flexed on the thigh by an assistant, another assistant placed his locked hands round the femur, drawing it forward.

The epiphysis was then forced into position and the leg extended. This at first failed to effect reduction, but a second attempt completely succeeded; the length being fully restored and the parts bearing a proper relation to one another. A McIntyre's splint was adjusted and evaporating lotions applied. Pulsation at once returned in the tibial vessels, the engorged veins emptied themselves, and normal sensation was restored to the limb within a few hours. The swelling of the leg gradually subsided.

On Jan. 7, a double-inclined plane was substituted for the McIntyre's splint.

On Jan. 27, the effusion into the knee joint had almost disappeared, and a Liston's long splint was applied, there being no tendency to displacement.

On Feb. 10, the splint was removed, there being firm union.

On Feb. 27, he could raise the limb without pain. A Thomas's knee splint was applied, and he was made an out patient.

A month afterward the splint was discarded, and he was allowed to use the limb. There being some stiffness of the knee-joint he was recommended to have it rubbed with oil night and morning, and was encouraged to flex it more and more every day.

When seen two months afterward the joint was capable of being fully flexed, there was no deformity, and the left leg was as useful as the right.

Besides the above, I have seen within the last few years two other cases under the care of my colleagues. In one, the excessive swelling present at the time of the injury prevented a diagnosis being made until a fortnight after the injury, when reduction under ether was attempted, but failed, and excision of the joint had to be performed, as it was necessary that some-

thing should be done to remove the pressure from the popliteal vessels. In another, diagnosed early, reduction was easily effected, and the ultimate result was very good. In all the recorded cases, direct violence has been the cause of this displacement; for instance, in M. Coural's case, a boy whilst running slipped with his leg in a hole up to his knee and fell violently forward; in the example given by Dr. Little a boy hanging on the back of a wagon had his leg caught in the spokes of the wheel whilst in rapid motion; in Dr. Black's case a like accident happened; in Mr. Hey's, the child was run over by a cab; in Mr. Wheelhouse's, a fall of earth was the cause; in the case I have here reported, the kick of a horse produced the displacement.

The diagnosis of such extensive injury might be thought to be devoid of any difficulty; yet, in one case mentioned, the extensive swelling rendered the nature of the injury doubtful for a time. In most cases there can be little difficulty; since the shortening of from one to two inches, the projection of the lower end of the diaphysis in the popliteal space, the displacement of the epiphysis on the front of the femur, and the interference with the circulation of the leg, when taken together with the cause of the injury and the age of the patient, form a group of symptoms pathognomonic of this form of fracture.

The prognosis would seem to be extremely serious, unless the injury be diagnosed and treated at once, if we may judge from the reported cases, in nearly all of which amputation had to be performed.

The dangers, besides the usual ones consequent on so severe an injury, arise from the pressure of the lower end of the diaphysis on the popliteal vessels interfering seriously with the circulation of the leg, and either producing great œdema, or gangrene; or leading to secondary hemorrhage, as in Dr. Little's case.

In a recently published work on "Fractures and Dislocations" I noticed the following paragraph referring to this displacement.

"The symptoms are much the same as those of transverse fracture of the lower end of the femur, and the possibility of this

lesion having taken place, must be borne in mind in dealing with injuries of this part in young persons."

This, to my mind, conveys quite a wrong impression, for in fracture of the lower end of the femur the upper end of the lower fragment is drawn backward into the popliteal space by the gastrocnemius; whereas in diastasis, the lower end of the upper fragment projects into the popliteal space.

In the same work I should also differ from the following remark on treatment:

"The treatment consists of putting up the leg in a double inclined plane in order to relax the muscles which act upon the fragments, and treating the case as an ordinary fracture."

If this advice was followed out, it might do very well for fracture of the lower end of the femur, but in diastasis neither would the deformity be removed nor the danger of gangrene averted.

As regards treatment, *reduction under ether* would seem to be the wisest plan to adopt, and this if difficult would be facilitated by the division of the tendo Achillis. After reduction, either the long splint with weight and pulley, or the double inclined plane, may be employed to return the part in position.

Should reduction be impossible, or retention of the fragments in apposition unattainable, then excision may be adopted; but if the large vessels be ruptured, or gangrene occur, amputation can then be the only resource.